

digit subequal to (in *Epomops* much shorter than) metacarpal of same digit.

(11) Vertical fasciæ of mesopatagium few (about 7-8) and broadly spaced. In *Epomops* unusually numerous (36-47) and crowded.

General size of single species known very small, as *Micropteropus pusillus*: forearm about 50-60 mm. Size of known species of *Epomops* much larger: forearm 82-100.5 mm.

Small whitish hair-tufts at anterior and posterior base of ears, as in all Epomophorine genera.

For the loan of the type of this highly interesting fruit-bat I am indebted to Sr. A. F. de Seabra, Museu Bocage, Lisbon. The specimen is a fully adult female, teeth practically unworn.

XII.—On some Species of the Genus *Epomops* *.

By KNUD ANDERSEN.

I. *Epomops franqueti* and *comptus*.

Epomophorus franqueti, Toms, P. Z. S. 1860, p. 54, pl. lxxv.—Type locality, Gaboon. Type, in the Paris Mu-

* *Epomops*, originally founded by Gray (1866), was by Dobson (1878) not distinguished from *Epomophorus*; by Matschie (1899) it was allowed to stand as a "subgenus" of *Epomophorus*, but by Miller (1907) again united with *Epomophorus*, probably owing to its general resemblance to the latter genus in dentition and external aspect. I find myself compelled to disagree with Miller. Both *Epomops* and *Epomophorus* subsist on soft fruits, but in having adapted themselves to this diet they have, in certain respects, followed essentially different lines of development. In *Epomops* the rostrum and palate are broadened, in *Epomophorus*, on the contrary, unusually narrow; in *Epomops* the postdental palate has preserved the common "Rousettine" (flattened) shape, in *Epomophorus* it is deeply hollowed out posteriorly; in *Epomops* the three anterior interdental palate-ridges are thick and prominent, conspicuously contrasting with the thin and serrate postdental set of ridges, in *Epomophorus* the whole set of ridges are peculiarly modified, without contrast between the interdental and postdental ridges; also the hyoid bones and pharyngeal sacs are different in the two genera. *Epomops* is in fact much more closely related to *Hypsignathus* and *Pterotes* than it is to *Epomophorus*. If we leave *Epomops* and the short-nosed (in the skull almost *Cynopterus*-like) *Micropteropus* in *Epomophorus*, then *Epomophorus* becomes decidedly the most heterogeneous genus of fruit-bats; if we separate *Epomops* and *Micropteropus*, then *Epomophorus* stands as a perfectly homogeneous group, sharply defined against all other genera of the Epomophorine section, and in the shape of the postdental palate contrasting even with all other genera of Megachiroptera.

seum, an adult male, mounted skin, skull extracted, soft palate destroyed, two pairs of upper incisors. Skull figured in P. Z. S. 1861, pl. i. fig. 3. Type examined.

Epomophorus comptus, H. Allen, Proc. Ac. N. Sci. Philad. 1861, p. 158.—Type locality, according to Allen, "W. Africa"; as belonging to Du Chaillu's collections the specimen was no doubt obtained in Gaboon; type in the collection of the Academy of Natural Sciences, Philadelphia. All that can be seen from Allen's long description is that *E. comptus* must be an *Epomops*, not an *Epomophorus*, and that the single specimen he had before him must have been a female (he does not mention the sex). Now, the fact that the type locality of *E. comptus* is the same as that of *E. franqueti* easily suggests the idea, if not, perhaps, *E. comptus* is simply the female of *E. franqueti*. Allen does not seem to have known the description of *E. franqueti*, in any case he does not compare *E. comptus* with that species, but only with *Epomophorus* "*gambianus*" and "*schoënsis*." But even if Allen had known Tomes's description, it is doubtful if he would have identified Du Chaillu's specimen with *E. franqueti*, considering that the type of *franqueti* is a large male, that of *comptus* a small female; the sexual difference, in size as well as in certain other characters, is in *Epomops* considerable. I may add that my suspicion as to the possible identity of *E. comptus* and *franqueti* was strengthened by the circumstance that, although I have had the privilege of examining a larger series of *Epomops* than any other single writer, I have never been able to find more than one species of the present genus in Gaboon or in the neighbouring countries to the north, east, and south. All doubt has now been removed by the additional information most kindly sent me by Mr. James A. G. Rehn, Philadelphia, after a re-examination of the type of *E. comptus*. It is a female of *E. franqueti*; all the decisive characters and measurements entirely agree with those of females of the eastern race of that species, *E. f. franqueti*. The type is an unmounted skin, skull extracted, soft palate destroyed; as mentioned by Allen, a single pair of upper incisors (actually lost, but alveoli present); forearms broken, hence the extraordinarily small measurement of the forearm given by Allen (3 in. = 76 mm.); from the measurement of the third metacarpal given by Rehn (in litt.), viz. 60 mm., it may safely be said that the real length of the forearm has been not less than 85 mm.—Mammalogists will no doubt feel some pleasure in being able to put *E. comptus* down as a synonym of *E. franqueti*. Those who, with Dobson's Catalogue as a guide, have tried to identify a

specimen of *Epomops*, will rather too often have made the experience that they had better give it up, for the specimen would agree with neither of the diagnoses offered in that book.

Dobson's method of discriminating E. comptus from E. franqueti.—Dobson gave the following brief diagnoses of the two "species" (his reference to the different "mode of attachment of the wings to the toes" may be left quite out of consideration here; the insertion of the membranes is the same in all forms of *Epomops*). *E. comptus*: third palate-ridge complete, undivided; a single pair of upper incisors in adults. *E. franqueti*: third palate-ridge developed on sides only [*i. e.* broadly separated in middle]; outer incisors wanting only in very old individuals. As these diagnoses have been universally accepted, without or with (Matschie) hesitation, for more than thirty years, it may perhaps be of some interest to trace them back to their origin. It is evident that Dobson cannot have taken them from Tomes's or Allen's descriptions, for neither of these authors mentions the palate-ridges; nor can he have known the palate-ridges from personal examination of the types nor from secondhand information, for in both of the type-skulls the soft palate has been destroyed. The explanation is this:—

Dobson's material of *Epomops* was exceedingly limited, only four specimens, one from Sierra Leone, two from Gaboon, and one without locality, all adults. In one of these, a female from Gaboon (Cat. Chir. p. 14, specimen "a"), he found only one pair of upper incisors; as this character agreed with Allen's description of *E. comptus* ($\frac{1}{2}$ – $\frac{1}{2}$ incisors), he naturally identified this specimen with *E. comptus*, and finding in the same specimen the third palate-ridge continued uninterrupted across the palate, he combined these two facts into the diagnosis of *E. comptus* referred to above: third ridge undivided, only one pair of upper incisors in adults. In two of the three other specimens (the third is senile and has lost all incisors above and below), as well as in Tomes's figure of the type skull of *E. franqueti* (or perhaps by actual examination of this latter during one of his visits to Paris), he found two pairs of upper incisors, and in one of the specimens, viz. that from Sierra Leone (p. 13, specimen "a"), the third palate-ridge broadly interrupted in the middle; this is the basis of his diagnosis of *E. franqueti*: third ridge divided, outer upper incisors present "except in very old individuals." But he overlooked the important fact that in two of the three specimens referred by himself to *E. franqueti* (p. 13, "b" and "c") the third ridge is, contrary to his diagnosis of that species, undivided in the middle!

In the light of the now available much completer material, Dobson's four specimens must be identified as follows:— His "*E. franqueti*" from Sierra Leone (p. 13, "a"), the only one with the third palate-ridge divided in the middle, is a distinct species, *E. buettikoferi*; his two other specimens of "*E. franqueti*" (p. 13, "b" and "c") and the only specimen referred by him to "*E. comptus*" are all *E. franqueti franqueti*.

II. Third Palate-ridge in *E. franqueti* and *buettikoferi*.

It will be noticed from the above that Dobson's statement that in some individuals of the present genus the third palate-ridge is continued uninterrupted across the palate, in others distinctly divided in the middle, is by no means without foundation in facts. Only the difference is not, as believed by Dobson, a difference between *E. comptus* and *franqueti*, which, on the contrary, are but two names of one species, but between *E. franqueti* (ridge undivided) and *E. buettikoferi* (ridge divided). The character would be very convenient indeed for a ready discrimination of these two species, if it were absolutely constant. It is so in the large majority of cases; it is perhaps always so in the case of *E. buettikoferi*, but individuals of *E. franqueti* occur, although apparently very rarely, in which the ridge is distinctly divided in the middle.

In p. 104 of the present paper I give a tabular record of the condition of the third palate-ridge in twenty-six skulls of *E. franqueti* and *buettikoferi*. A larger number of skulls has been examined, but those tabulated are the only ones in which the palate-ridges have been preserved in sufficiently intact condition. The results are these:—

(1) The condition of the ridge, whether continuous or divided, is entirely independent of the presence or absence of the outer pair of upper incisors (i^2). Dobson's contention that the presence of i^2-i^2 in adult individuals is associated with a divided third ridge (his *E. franqueti*) and the absence of those teeth with an undivided ridge (his *E. comptus*) is clearly untenable.

(2) The palate-ridges have been examined in twenty-two individuals of *E. franqueti*, representing both subspecies and localities dotted over nearly the whole area inhabited by the species. In twenty-one of these individuals the third ridge is practically undivided in the middle, either absolutely continuous [indicated in the table by the word "Undivided,"

without brackets] or, not infrequently, with a distinct notch at the middle suggesting an initial stage towards a splitting of the ridge [indicated by "(Undivided)"]. In one single individual the ridge is distinctly separated in the middle, by a space about equal to the breadth of p^4 ; this individual (Kradji, Togo) is in every other respect a typical *E. f. strepitans*.

(3) The palate ridges have been examined in four skulls of *E. buettikoferi*, including the type of the species. In all the third ridge is broadly divided in the middle.

The fact that the condition of the third palate-ridge is not absolutely diagnostic does not in the least affect the validity of *E. buettikoferi* as a distinct species. It differs in other and more important characters from *E. franqueti*.

III. Outer Upper Incisors.

Material,—thirty adult skulls of *E. franqueti* (both subspecies) and *E. buettikoferi*; see table, p. 104.

In eleven of these i^2 is present on both sides; in five present on one side only; and in fourteen absent on both sides. i^2 is present in all perfectly immature individuals examined (not recorded in the table), but as soon as the individuals are full-grown the presence or absence of the outer upper incisors appears to be independent of the age. If the loss of i^2 were entirely or chiefly an age character, we should expect to find these teeth present chiefly in adult individuals with unworn teeth, absent chiefly in individuals with worn teeth. But the facts are not in favour of this assumption. Of the eleven skulls with i^2 present on both sides, no less than eight have the cheek-teeth conspicuously worn (marked with one asterisk in the table) or even much worn (two asterisks); of the fourteen skulls with i^2 absent on both sides (and their alveoli obliterated) two are only young adults (*i. e.* full-sized, but with distinct signs of slight immaturity), and four, though fully adult, have the teeth quite or nearly unworn (no asterisk in the table).

To decide, with certainty, the question whether there is any specific or subspecific difference in the deciduousness of i^2 would require a much larger material than at present obtainable. But so far as this material goes, i^2 appears to be much more frequently lost in *E. f. franqueti* than in *E. f. strepitans* and *E. buettikoferi*. The subjoined table points decidedly to this conclusion, but it is admitted that the number of skulls of *E. f. strepitans* and *buettikoferi* is too small for generalizations of this kind:—

	Skulls examined.	Both i^2 present.	One i^2 absent.	Both i^2 absent.
<i>E. f. franqueti</i>	18	17 pct.	11 pct.	72 pct.
<i>E. f. strepitans</i>	7	57	29	14
<i>E. buettikoferi</i>	5	80	20	0

Third Palate-ridge and Outer Upper Incisors †.

		Third palate-ridge.		i^2-i^2 .
<i>E. f. strepitans.</i>				
♀	imm.	Gold Coast	(Undivided.)	
♂	ad.	" "	Undivided.	++
♂	ad.	Togo: Kradji	Divided.	+ ÷ **
♂	ad.	Lagos	Undivided.	++
♂	ad.	S. Nigeria: Abonnema . . . . .	....	++*
♂	ad.	" " . . . . .	....	+ ÷ *
♂	ad.	" Asaba	Undivided.	÷ ÷ *
♂	ad.	" (type) . . . . .	....	+ ÷ *
♂	imm.	" Oban	Undivided.	++*
<i>E. f. franqueti.</i>				
♂	ad.	Old Calabar	Undivided.	÷ ÷ **
♂	ad.	" "	(Undivided.)	+ ÷ *
♂	ad.	Cameroons	Undivided.	÷ ÷
♂	ad.	"	Undivided.	÷ ÷
♂	ad.	" Bitye, R. Ja	Undivided.	÷ ÷ *
♂	yg.	" Victoria	Undivided.	÷ ÷
♂	ad.	" Kribi	Undivided.	....
♂	juv.	" Yaunde	Undivided.	....
♂	yg.	" "	Undivided.	÷ ÷
♂	ad.	" Aqua Town	Undivided.	++*
♂	ad.	" Bipindi	(Undivided.)	÷ ÷
♂	juv.	Benito R.	(Undivided.)	....
♂	ad.	Gaboon (type) . . . . .	....	++*
♂	ad.	" (type of <i>comptus</i>) . . . . .	....	÷ ÷ *
♂	ad.	" Dongila	Undivided.	++**
♂	ad.	" Elloby	Undivided.	÷ ÷ *
♂	ad.	" Como R. . . . .	....	÷ ÷ **
♂	ad.	Loanda: Malange	(Undivided.)	÷ ÷ *
♂	ad.	Monbuttu: Tingasi	Undivided.	÷ ÷ *
♂	ad.	Semliki R. . . . .	....	÷ ÷
♀	ad.	Bukoba, Victoria Nyanza . . . . .	....	+ ÷
<i>E. buettikoferi.</i>				
♂	ad.	Sierra Leone	Broadly div.	++**
♂	ad.	" "	Broadly div.	++*
♂	ad.	Liberia	Broadly div.	+ ÷
♂	ad.	" (type)	Broadly div.	++
♂	ad.	" . . . . .	....	++*

† Explanations to the table:—Undivided=perfectly continuous across the palate. (Undivided)=practically undivided, but with a distinct notch in the middle, suggesting an initial stage towards separation. ++= i^2 present on both sides. + ÷= i^2 present on one side only. ÷ ÷= i^2 absent on both sides. No asterisk=teeth quite or nearly unworn. * teeth conspicuously worn. ** teeth much worn.

IV. *Epomops buettikoferi*.

Type locality, Liberia; type (examined) in the Leyden Museum. Described by Matschie (Megachir. p. 45; 1899) as an *Epomophorus* (as distinct from *Epomops*), and more particularly as a Liberian representative of "*Epomophorus macrocephalus*." Matschie had not seen the specimen, but relied on some external measurements found in literature. The type represents in reality a distinct species of *Epomops*, and its true characters are entirely different from those given by Matschie. The species is thus far only known from Sierra Leone and Liberia, but may have a wider distribution along the Guinea coast.

V. *The Subspecies of Epomops franqueti*.

Forty-six specimens of *E. franqueti* have been examined, in the collections of the Leyden, Berlin, Paris, and British Museums, from the following localities:—Gold Coast (eleven), Togo (one), Lagos (one), S. Nigeria (Asaba, Abounema, Oban: six), Old Calabar (three), Cameroons (Bitye, Victoria, Kribi, Yaunde, Aqua Town, Mungo, Bipindi, Klein Batanga: twelve), Spanish Guinea (one), Gaboon (Dongila, Elloby, Como R.: four), Loanda (Malange: one), Niam-Niam (one), Tingasi (one), Semliki R. (one), Bukoba (one), uncertain localities (two).

They represent two fairly well-marked geographical races. The specimens from the Gold Coast, Togo, Lagos, and S. Nigeria average conspicuously smaller than those inhabiting the area from Old Calabar south to Loanda and east to Victoria Nyanza. Any other difference than that of size I am unable to see, and, as shown in the subjoined table, this average difference is much better pronounced in the skull than in the external dimensions, and much better so in males than in females; specimens of the latter sex are sometimes difficult to allocate to subspecies:—

	Smaller race. Males.	Larger race. Males.	Smaller race. Females.	Larger race. Females.
Skull, total length	46·8-48	49-53	41·8-43·5	43-47 mm.
Mandible	36-39	40-43	?-?	33·8-38 "
c-m ¹ , crowns	14·5-16·2	16·5-18	14·5-14·8	14·8-16·7 "
Forearm	88-89·5	90·5-96	84·5-85	82-93 "
3rd metacarpal ..	62·5-65·5	67-70	60-60·5	60-66 "
Ear, length	22-24	23-25	21·5-?	23·5-25·5 "
Tibia	31·5-35	33·5-37·5	?-?	32-34·5 "

The larger race will have to stand as *E. f. franqueti*, the smaller race may be known as

Epomops franqueti strepitans, subsp. n.

Type, ♂ ad., skin and skull, Asaba, S. Nigeria; presented by Dr. W. H. Crosse; B.M. 95. 5. 3. 7.

XIII.—*New African Mammals of the Genera Cricetomys and Procavia.* By R. C. WROUGHTON.

A CAREFUL comparison of the skins and skulls of specimens of the genus *Cricetomys* shows that at least two new forms require names. Until more complete material is available for study it seems most convenient to rank them as geographical races of *C. gambianus*.

Cricetomys gambianus emini, subsp. n.

A *Cricetomys* closely resembling *C. gambianus* (s. s.) in size and colour; with stouter teeth, larger palatal foramina and bullæ.

Fur rather harsh, 15 mm. long on back; individual hairs greyish white, with apical third brown. General colour above Mars-brown, paling to near "vinaceous cinnamon" on flanks; belly pure white. Arms and legs like back above, fingers and toes pure white. Slightly less than basal half of tail like back, remainder white.

Skull as in typical *gambianus*, but teeth larger, palatal foramina longer, bullæ somewhat smaller.

Dimensions of the type (measured on the skin):—

Head and body (c.) 400 mm.; tail (c.) 370; hind foot 72.

Skull: greatest length 75; basilar length 65; zygomatic breadth 36; nasals, length 32; palatal foramina 9; diastema 25; greatest breadth of m^1 3.5; upper molar series 11.5.

Hab. Gadda, Mombattu.

Type. Adult male. B.M. no. 87. 12. 1. 55. Collected February 1884, and presented to the Natural History Museum by Emin Pasha.

The stout teeth and large palatal foramina distinguish *emini* from typical *gambianus*, and its bright colouring prevents any confusion with the next form.